

REMARKS

Reconsideration of this application is respectfully requested in view of the foregoing amendment and the following remarks.

By the foregoing amendment, applicant has cancelled claim 10 and amended claims 1, 3, 5 and 8. Claims 1-9 are now pending.

In the Office Action mailed March 1, 2002, the Examiner rejected all of the pending claims under Section 102 or Section 103 as unpatentable over US Patent No. 5,521,429 to Aono, et al. To the extent that this rejection might still be applied to the currently pending claims, it is respectfully traversed as follows.

Amended claim 1, which is the only independent claim, now sets forth among other things that the thick portion of the external connection electrode is exposed only at the mounting surface of the resin package. This new limitation is equivalent to setting forth that the thick portion of the external connection electrode is spaced from all side surfaces of the resin package because if the thick portion extends up to or beyond any one of the side surfaces of the package, it is inevitably exposed at the side surface.

The technical significance of the present invention defined in amended claim 1 is fully described in Paragraphs 0045 and 0046 (pages 11 and 12) of the specification. Briefly, if the thick portion is exposed not only at the mounting surface (bottom surface in the embodiment) but also at any one of the side surfaces of the resin package (as shown in Fig. 8), a deposit of bonding solder 60 inevitably flows only the side surface 3a (or 20a') due to surface tension and bulges laterally for merging with a solder deposit for a nearby packaged semiconductor device,

consequently making it difficult to mount a plurality of semiconductor chips at a high density.

The present invention solves this problem by making the thick portion to be exposed only at the mounting surface of the resin package, as clearly shown in Figs. 1 and 4.

As noted by the Examiner, US Patent No. 5,521,429 to Aono et al. discloses a plurality of electrodes 12 (leads) each of which has a thick portion and a thin portion. However, most portion of each lead 12 projects beyond a side surface of the resin package 14 and is therefore considered to be exposed not only at the mounting surface of the package 14 but also at the side surface of the package 14. As a result, a deposit of solder applied to the lower surface of the lead 12 flows onto the exposed edge face of the lead for merging with a solder deposit for a nearby packaged semiconductor device. Therefore, this reference fails to disclose as suggest the present invention defined in amended claim 1.

US Patent No. 5,150,193 to Yasuhara et al is cited only with respect to claim 10 which has now been deleted.

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Art Unit: 2826
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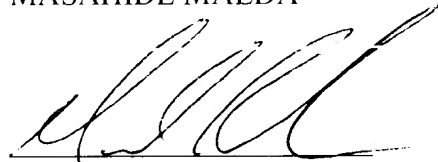
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In view of the foregoing all of the claims in this case are believed to be in condition for allowance. Should the Examiner have any questions or determine that any further action is desirable to place this application in even better condition for issue, the Examiner is encouraged to telephone applicants' undersigned representative at the number listed below.

Respectfully submitted,

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Attachments: Amended Claims w/ Markings

MDB/lrhj

VERSION WITH MARKINGS TO SHOW CHANGES MADE TO CLAIMS

1. (Amended) A semiconductor device comprising:
a semiconductor chip;
an external connection electrode connected to the chip; and
a resin package which covers the chip and has a mounting surface;
wherein the electrode includes a thick portion and a thin portion, the thick portion being exposed to outside only at the mounting surface of the package.

3. (Amended) The semiconductor device according to claim 2, wherein the projection includes [an end] a bottom surface exposed to outside at the mounting surface of the package and four side surfaces [closely] entirely covered with the package.

5. (Amended) The semiconductor device according to claim 1, wherein the electrode includes two thick portions spaced from each other and a thin portion connecting the thick portions, both of the two thick portions being exposed to outside only at the mounting surface of the package.

8. (Amended) The semiconductor device according to claim 1, further including an additional electrode separate from the external connection electrode, the additional electrode including a thick portion and a thin portion, the thick portion of the additional electrode being exposed to outside only at the mounting surface of the package.

10. (Deleted)